

REBUTTAL TESTIMONY OF

STEPHEN A. BYRNE

ON BEHALF OF

SOUTH CAROLINA ELECTRIC & GAS COMPANY

DOCKET NO. 2008-196-E

Q. PLEASE STATE YOUR NAME AND TITLE FOR THE RECORD.

A. My name is Stephen A. Byrne. I am Senior Vice President of South Carolina Electric & Gas Company (“SCE&G” or the “Company”).

Q. HAVE YOU PREVIOUSLY SUBMITTED DIRECT TESTIMONY IN THIS PROCEEDING?

A. I have.

Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY?

A. The purpose of my rebuttal testimony is to respond to certain points made by Nancy Brockway, the witness for the Friends of the Earth, related to SCE&G's decision to construct VCSNS Units 2 & 3 and the selection of Westinghouse AP1000 units as the units best suited to meet SCE&G's requirements. My testimony also responds to the testimony of Dr. Wilder concerning the experience curve or learning curve related to nuclear generation.

1 **THE SELECTION OF NUCLEAR GENERATION**

2 **Q. HOW DO YOU RESPOND TO MS. BROCKWAY’S CONTENTION**
3 **THAT THE COMPANY DID NOT ADEQUATELY CONSIDER**
4 **OPTIONS OTHER THAN NUCLEAR GENERATION?**

5 A. Ms. Brockway asserts that “[t]here are significant alternatives to the
6 two nuclear generation plants at issue in this docket that are not adequately
7 explored or valued in the Company’s assessment;” and that “it is not clear
8 that the Company performed any serious comparisons of its preferred
9 option to other possible scenarios.” (Brockway Direct at pp. 8, 14.) She
10 goes on to state her assumption that the Company determined to build base
11 load generation “without considering, and modeling, scenarios including
12 intermediate and peaking options” (Brockway Direct at p. 15.)

13 These assertions are simply not true. In the resource selection
14 process, SCE&G modeled gas peaking and intermediate scenarios, as well
15 as coal scenarios, as alternatives to nuclear generation. Nuclear generation
16 was modeled against these options throughout the selection process and the
17 cost of these alternatives provided the data against which nuclear prices
18 were evaluated. Specifically, the analysis of intermediate and peaking
19 scenarios was revisited multiple times throughout the 2005-2007 selection
20 process and the data on them was reevaluated at critical points during the
21 process. For example, one such reevaluation occurred during late 2006
22 when negotiations with Westinghouse/Stone & Webster were suspended

1 and the proposals from the three potential nuclear technology vendors were
2 revisited.

3 Although all alternatives were seriously evaluated, it is still the case
4 that there are important non-price advantages to nuclear generation. The
5 most important of these is the fact that nuclear generation is not subject to
6 the same degree of fuel cost risk and environmental compliance risk as gas
7 and coal generation. In evaluating its capacity options, however, SCE&G
8 considered all reasonable and practical options for meeting its customers'
9 growing demands for electricity.

10 As to alternative energy sources and Demand Side Management
11 ("DSM") resources, Dr. Lynch and I have already submitted testimony
12 concerning the limitations on the availability and reliability of wind and
13 solar power in South Carolina. Ms. Brockway does not provide any data to
14 the contrary. As Dr. Lynch has shown in his direct testimony, the
15 Company has made extensive use of peak-shaving DSM options. The
16 Company has factored into its forward-looking resource evaluations
17 significant DSM-related reductions in energy and demand based on the
18 implementation of new lighting and appliance efficiency standards. In
19 addition, the Company is undertaking a full scale review of current DSM
20 options to determine what potential exists for expanding its reliance on
21 DSM in the future.

1 DSM and alternative energy sources are resources that can
2 supplement other resources on SCE&G's system and will clearly play a
3 role in meeting or reducing the future energy needs of our customers. As
4 Dr. Lynch has testified, all of his future supply scenarios include room for
5 significant supplemental energy and capacity being provided from
6 alternative energy and DSM resources. However, the Company has
7 appropriately determined that these resources would not be a substitute for
8 new base-load generation in the 2016-2019 time period and that it would
9 not be prudent or responsible to rely on DSM or alternative energy
10 resources, or some combination of them, to the exclusion of new fossil or
11 nuclear generation.

12 **Q. HOW DO YOU RESPOND TO MS. BROCKWAY'S SUGGESTION,**
13 **ON PAGE 17 OF HER TESTIMONY, THAT OFF-SYSTEM**
14 **PURCHASES ARE AN ALTERNATIVE TO NEW BASE LOAD**
15 **RESOURCES?**

16 A. SCE&G is a member of the Southeastern Electric Reliability Council
17 ("SERC") and buys and sells electricity in regional markets on an ongoing
18 basis, and so is well aware of the generation resources that exist in the
19 Southeastern United States. The Company plans to purchase off-system
20 resources as available to meet elements of its customers' growing energy
21 needs demand between 2007 and 2019. However, there is no pool of
22 uncommitted generation resources on the market or potentially on the

1 market in the Southeast that could meet SCE&G's need for additional base-
2 load resources (*i.e.*, resources capable of meeting both capacity needs and
3 providing substantial supplies of energy over time.) Our neighboring
4 utilities, Duke, Progress, Southern, Santee-Cooper, Dominion, and TVA,
5 are in the same situation. All have announced plans to build new base-load
6 generation – in fact all are planning to build new nuclear generation in the
7 near future.

8 **Q. HOW DO YOU RESPOND TO MS. BROCKWAY'S SUGGESTION,**
9 **ON PAGE 15 OF HER TESTIMONY, THAT SCE&G HAS NOT**
10 **JUSTIFIED ITS DECISION TO RELY ON "INCREMENTAL BASE**
11 **LOAD GENERATION OWNED BY THE COMPANY AS ITS**
12 **PREFERRED OPTION?"**

13 A. There are several parts to this question. First, the Company prefers
14 to own its own generation where possible because doing so allows it to
15 control the operation and maintenance of its generating units; the
16 preventive maintenance programs and schedules for their units; their
17 capacity upgrades and environmental upgrades; their fuel supply issues, and
18 their staffing and staff training programs. Properly managing all aspects of
19 a plant's operations and maintenance is important to reliability and
20 availability of the plant and the system over the long-term. Ownership also
21 allows SCE&G to manage its multiple units as a fleet for greater reliability
22 and efficiency. Moreover, generation plants tend to be valuable assets over

1 time, and customers benefit when SCE&G as owner has full rights to the
2 plants for their entire operating lives.

3 All these factors notwithstanding, the preference for ownership is
4 just that, a preference. There may be times when making exceptions to the
5 preference are appropriate. However, all other things being equal, the
6 Company prefers to build and own the generation resources that serve its
7 customers.

8 The second part to this question concerns the assertion that SCE&G
9 does not have an objective basis for determining that base load generation
10 is the most appropriate type of resource to meet the needs of the system in
11 the 2016-2019 time frame. To the contrary, as Mr. Marsh's direct
12 testimony establishes, SCE&G determined that base load generation is the
13 most appropriate resource to meet its 2016-2019 requirements based on
14 objective operational considerations. As indicated in Mr. Marsh's
15 testimony, growth in demand on SCE&G's system has been met for over
16 twelve years with peaking and intermediate resources exclusively. Load
17 growth is requiring the system to rely on these peaking and intermediate
18 plants, as well as older and less efficient coal plants, more intensively than
19 would otherwise be most efficient or best for the system operationally.
20 Additional base-load generation is needed to reduce reliance on these other
21 less-efficient resources.

1 That said, Ms. Brockway's assertion that the Company opted for
2 base load generation "without considering, and modeling, scenarios
3 including intermediate and peaking options" is factually inaccurate.
4 (Brockway Testimony at p. 15.) While base load generation would clearly
5 be the best type of resource to add to SCE&G's system in the 2016-2019
6 time period, Dr. Lynch extensively modeled intermediate and peaking
7 resources, and the results of those scenarios were carefully considered in
8 making the decision to select VCSNS Units 2 & 3.

9 **Q. HOW DO YOU RESPOND TO MS. BROCKWAY'S SUGGESTION,**
10 **ON PAGES 31-33 OF HER TESTIMONY, THAT THE ESTIMATED**
11 **COST OF PROPOSED UNITS ARE TOO LOW?**

12 A. The cost estimates in the Application are not theoretical numbers.
13 They are based on a fully negotiated EPC contract under which substantial
14 portions of the cost of the units are fixed or are firm subject to escalation.
15 The remaining elements have been calculated based on reasonable
16 projections of the labor, materials and other cost involved, and include
17 reasonable contingencies. The cost of the new units in particular reflect a
18 superior construction site geologically; the benefit of having rail, electric
19 transmission, nuclear security, administrative facilities, water supplies and
20 other infrastructure already in place on that site; the benefits of the Base
21 Load Review Act in reducing capitalized interest during construction; and
22 very hard fought price concessions obtained from the contractors who were

1 motivated to move the project forward. The fact that some parties
2 published higher forecasts of general nuclear construction costs in the 2007
3 period, as Ms. Brockway indicates, is not surprising.

4 The Company has explained the cost risks related to the units in
5 detail in its Application, at Exhibit J, and in my direct testimony. Nothing
6 in Ms. Brockway's testimony changes my opinion that these risks, though
7 real, are being effectively managed by the Company.

8 **Q. HOW DO YOU RESPOND TO MS. BROCKWAY'S SUGGESTION,**
9 **ON PAGE 35-36 OF HER TESTIMONY, THAT THE**
10 **CONSTRUCTION SCHEDULE FOR THE PROPOSED UNITS IS**
11 **TOO SHORT?**

12 A. The construction schedule contained in the Application is not a
13 theoretical schedule but is based on a fully developed construction plan,
14 backed by liquidated damages, to which Westinghouse/Stone & Webster is
15 contractually committed. Four AP1000 units are under construction as we
16 speak in China, and Westinghouse's parent company, Toshiba Corp, has
17 recent nuclear construction experience in Asia including advanced reactors
18 which it has constructed in as little as 39 months. Toshiba has committed to
19 a process of transferring to Westinghouse/Stone & Webster the techniques
20 it has used in these other projects to optimize the schedule for construction
21 of U.S. AP1000 units. It should also be pointed out that the technology for
22 computer assisted design and three-dimensional modeling of power plants

1 has improved dramatically since the 1970's when the last round of nuclear
2 construction took place in the United States. Our construction vendors also
3 will use modular construction techniques for multiple utilities in the
4 Southeast all of whom are committed to the same standard design. The
5 problems that were encountered in the construction cycle 30 – 40 years ago
6 are not relevant given today's technology and standardization.

7 As to permitting, the AP1000 units are fully design certified by the
8 NRC though revision 15. There is no reason to expect that the
9 enhancements in the design reflected in later revisions will not be approved
10 in time to meet the construction schedule contained in the EPC Contract.

11 The Company has explained the schedule risks related to the units in
12 detail in its Application, at Exhibit J, and in my direct testimony. Nothing in
13 Ms. Brockway's testimony changes my opinion that these risks, though
14 real, are being effectively managed by the Company.

15 **Q. HOW DO YOU RESPOND TO DR. WILDER'S SUGGESTION**
16 **THAT BY BUILDING AP1000 UNITS SCE&G WILL BE**
17 **STARTING OVER IN THE LEARNING CURVE AS FAR AS**
18 **NUCLEAR OPERATIONS?**

19 A. While I understand Dr. Wilder's contention, I think he has missed an
20 important point about the learning curve in the nuclear industry generally
21 and on SCE&G's system specifically. The extensive learning that has
22 taken place in nuclear operations over the past decades involves a great

1 deal of learning about nuclear operations generally and applies across the
2 board. During recent decades, the industry has improved its approach to
3 things like preventive and predictive maintenance, inspection and testing
4 of equipment, staffing, training, human performance management,
5 management of nuclear operating culture, fitness for duty standards, root
6 cause analysis of problems and events, management of engineering
7 processes, outage scheduling and management, and vendor and supplier
8 quality control. These improvements apply across the industry and will
9 apply to SCE&G's construction and operation of VCSNS Units 2 & 3. In
10 addition, the industry is very deliberate about sharing these improvements
11 industry-wide, both nationally and internationally. Over the course of my
12 career, I have been involved in many successful efforts to transfer U.S.
13 operating knowledge and experience to units operating in Europe, Russia,
14 Canada and the Third World. In that context, I have seen that the learning
15 curve within the industry applies even where the technologies of the units
16 in question and the operating contexts are quite different.

17 In addition, as indicated in my direct testimony, SCE&G intends to
18 use the strong nuclear operating culture it has established at VCSNS Unit 1
19 as the basis for the operating culture for VCSNS Units 2 & 3. Moreover,
20 one reason that SCE&G chose the Westinghouse AP1000 technology is
21 because it represents the direct evolution of the design of the current unit
22 on site and shares both fundamental design principals/components and

1 operating characteristics with that unit. Another way to say this is that
2 SCE&G has chosen AP1000 units precisely because they will allow the
3 most seamless transfer of its existing learning curve advantages to the
4 operation of the new units.

5 **CONCLUSION**

6 **Q. IN SUMMARY, WHAT ARE YOU ASKING THIS COMMISSION**
7 **TO DO?**

8 A. On behalf of SCE&G, I would ask the Commission to rule that the
9 Company's decision to construct VCSNS Units 2 & 3 is prudent and
10 appropriate and that these units represent the best alternative for meeting
11 the future needs of SCE&G's customers and issue a Base Load Review
12 order as requested in the Application in this proceeding.

13 **Q. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?**

14 A. Yes, it does.